

# UEM 188/186EM

**Am188/186EM In-Circuit Emulator**

**Windows-based debugger included**

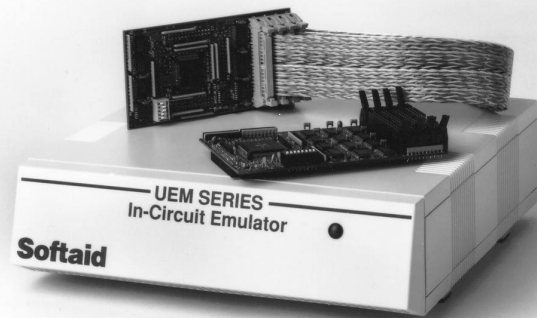
**256k emulation RAM; add up to 1 Mb.**

**1,000,000 hardware breakpoints**

**7 event conditions trigger the trace or breakpoint on any bus match, including ranges of addresses and data**

**32k-deep real time trace, with 32 bit time stamp**

**Performance analyzer shows min, max, and average time of up to 126 functions**



Affordable In-Circuit Emulation. No compromises. Softaid's UEM provides everything you need to debug the most sophisticated real time applications.

The UEM's Windows-based Source Level Debugger supports all compilers and assemblers. Point and click to set breakpoints on C lines. Display trace data in the original source. Set breakpoints graphically. Variables appear as defined, and maintain their scope attributes.

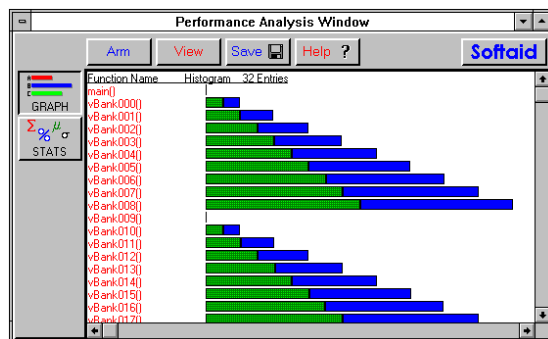
The UEM provides one million hardware breakpoints, so you can debug code in ROM or RAM, without altering your code. Seven Events break or trigger trace collection on any combination of addresses, data values, and cycle types. A pass counter defers the break or trigger for up to 64k iterations. Each event can include literally hundreds of ranges, each of the form "break if address > 1000 and (234<data<337)".

Need more breakpoint power? Use the UEM's IF-THEN conditions up to 3 levels deep, *all in real time*. You can even single step in interrupt service routines!

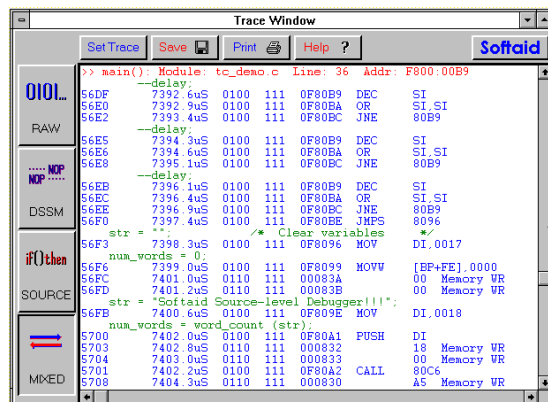
32k of trace, with a 32 bit time stamp, capture every bus cycle. Start and stop trace collection, and display the results, without slowing your application. Use a filter to limit collection to specific events.

The real time performance analyzer logs the minimum, maximum, and average execution time of up to 126 routines simultaneously. Find bottlenecks in seconds.

The Memory Monitor finds code that breaks rules you defined - such as writes to ROM, executes from data, or any access to reserved memory... *before* a million cycles overwrite the program.



*Performance analysis is a standard feature*



*The 32k trace buffer includes time stamps*

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# UEM Series

**Part Number: UEM-188/186EM**

## Processor Support

Processor: Am188EM and Am186EM  
25 Mhz Standard, 40 Mhz Optional  
PQFP and TQFP via adapters

## Source Level Debugging

Type: Windows debugger included  
Tools: All compilers, linkers and locates supported.

## Target Resources Used

Resources: None. All interrupts, I/O & memory unused.  
Waits: None inserted; Target waits will be serviced  
Refresh: If used, is maintained at all times.

## Emulation RAM

Size: 256 Kb of Emulation RAM standard  
Expansion: Options expand it to 1 Mb  
Resolution: 4 Kb mapping resolution  
Mapping: Open holes to access memory mapped I/O.

## Real Time Trace

Trace depth: 32768 cycles  
Display: Raw (machine cycles), Disassembled,  
Mixed (Source plus Disassembled), Source  
*You can start & stop trace, and display the data, while the program continues to execute..*  
Trace Buffer: Print or save buffer to disk  
Start: Start immediately  
Start on a trace trigger (bus match)  
Stop: Stop when 32k buffer fills  
FIFO data until a breakpoint occurs  
FIFO data until a trace trigger occurs  
FIFO data, center the trigger, so you can see what precedes and follows the trigger event.  
Trigger: 7 events (total bus matches) can be used to start and stop trace collection, in real time.  
Masking: Limits trace collection to specific cycles, specified by address, data and cycle type. For example, exclude the capture of a delay routine or only include certain I/O cycles.  
Time Stamp: Every cycle tagged with 32 bit time stamp  
Resolves time to 1/2 CPU clock rate

## Performance Analysis

Type: Measures time between entering and exiting functions, all in real time.  
Data collected: Minimum, maximum, and average execution time of each function, and iterations.

## Memory Monitor

General: Rule-based bus monitor for proactive debugging. You specify ranges of addresses and rules; any memory transaction that violates a rule will cause an immediate breakpoint.  
Ranges: Unlimited number, with 4k granularity  
Rules: Allow any access, Break on any write, Break on any fetch, Break on any access

## DMA and Interrupt Response

General: Internal DMA continues to run at a breakpoint in all modes. Interrupts disabled when stopped; reenabled when execution resumes.  
Background: Supports all DMA and interrupts even when stopped at a breakpoint.

## Communication

Serial: 9600 to 115,200 baud  
8-10,000 byte/second download rate  
Uses efficient packetized binary protocol.  
Parallel: Optional parallel link connects to the printer port (LPT:). Downloads 25,000 bytes/sec

## Standalone Operation

General: Operates with or without a target system  
Clock: Switch-selectable internal or external clock  
Memory: Emulation RAM can replace non-existent target memory.  
Signals: All critical signals (interrupts, DMA, wait, etc.) can be individually masked.

## Breakpoints

**General** - all breakpoints run at full speed, and work whether set in ROM or RAM space.

**Address breakpoints** - stops execution when a particular address is encountered. 1 million hardware address breakpoints.

**Event breakpoints/triggers** - stop execution or trigger trace collection when a particular address, cycle type, and data value is encountered. A pass counter holds off the breakpoint until the specified condition occurs up to 65,536 times. An interval timer measures the time between two events to 1 usec accuracy.

**Complex breakpoints** - Combine up to three events into a nested condition. Suppose function A fails only when called from B, but never when any other routine calls it. The Complex breakpoint lets you hold off breaking until the "B calls A" event occurs. A fourth event can reset the condition.

**External breakpoint** - Any low-going pulse on an external input immediately stops program execution.

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